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ABSTRACT

This review of some of the economical and educational dilemmas touching teacher education deals with the meaning of knowledge and the psychological requirements for the development of a knowledge base for teachers. Before teachers can play an innovating and flexible role in education they must first accept their roles themselves. The imbalances of a country's social system confronts political decision makers with the economical choice of either improving the training of teachers at the risk of higher costs or reducing facilities. While it is tempting to defend the cutting down of financial support with the argument that knowledge needed for a teacher's profession can be disseminated as 'objective knowledge' that can be sold or bought at the lowest price as every other commodity, this view cannot really be supported. New ideas about knowledge and the working of the mind stress the idiosyncratic status of cognition. Because the whole person is involved in teaching (thinking, acting, feeling in a challenging interaction with other people), it takes time to change cognitions useful for new situations. This type of experience should be included in teacher education as well as other experiences that may answer other imbalances found by teachers. (CB)

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Economical and educational dilemmas in teacher training

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1. Introduction

This is an era of rapid changes. Teachers and teacher educators are confronted with the same uncertainty as the political decision makers are.
For many industrialized countries the decisions are clear enough: cut backs in finance for education and a strong attack on the rights of teachers to influence the curriculum. The economic principle of searching for the lowest price of each productive factor puts pressure on education - teacher education included.
But never before so many demands were formulated in every country. Teachers are supposed to be successful in educating as many pupils as possible. They are supposed to select and guide the gifted, and to handle the problems of gender, race, religion, social class, etc. In their daily work they are performing myriad duties (Boyer, 1983).
What kind of teacher training facilities are needed to prepare people for this task? How can students be motivated for such a job?

In this paper I will combine some economical and educational dilemmas as far as teacher education is concerned . In particular my paper deals with the meaning of knowledge and the psychological requirements for the development of a knowledge base for teachers.
My analysis will be that teachers only can play consciously an innovating and flexible role when this role is recognized by the political decision makers and when this role is accepted by themselves. It means a program in which the real costs also should be analyzed in terms of investments in human potential and potentialities. That might carry with it consciousness-raising for both parties, with all the technical problems connected with it (van der Dussen, 1987a).

2. The loss of a pax 'educativa'

The educational system of a country is never a definite product. In many countries it can be analyzed as the temporary resultant of at least five forces or clusters of forces. These forces are 1. economic, 2. social and political, 3. scientific and technological, 4. religious and 5. educational forces (van der Dussen, 1987j). Each of these forces generates imbalances in the educational system as a whole.
In many countries (also in the Netherlands) we see a mixed economic system, in which a rapid change in the combination of the productive factors brings forth changing demands to the graduates of the schoolsystem. 'Education does not operate in a social vacuum' (Husén, 1979).
E.g. the development of the new information technology imposes a rather unexpected, burden on the educational system, as far as this system is expected to prepare young people for the demands of a 'computerized' society (Apple, 1987).
New social and political developments in a country may generate the desire for good education for as many children as possible instead of giving an elite acces to good education.

The five or more forces and combinations of them - working on a global scale as a result of the dissemination of information - have confronted teachers and teacher educators with the loss of *a pax 'educativa'.* I will define a pax ' educativa' as the more or less stable design for an educational system - particularly the structure and content of the curriculum - ,by which teachers are given a rest to do their job. In that case they can base their work on the required and well defined knowledge, attitudes and skills of their profession. The stable characteristics of the educational system as a whole can be evaluated in advance. With a pax ' educativa' I do not mean immobility or the absence of any disturbances from the outside but a non-threatening and gradual development of the educational system.
It can be argued that this idealistic situation has gone. 'The new needs of society require that education systems be capable of change' (OECD, 1985). Only in countries with closed borders and/ or a powerful central authority the educational system can be controlled more or less. In all other situations the imbalances generated by the five forces

destabilize the educational system continuously (Holmes, 1985). Therefore pre-eminently education - teacher education included - is the disputed territory of conflicting tendencies. It is the territory of the conflict between innovation and tradition, change and stability.
But not one Minister of Education or a particular government in power can be said to be responsable for all the conflicting tendencies. It is the way we organized our globe (or did not!).

3. Economical dilemmas

In this decade this uncertainty has become a more serious characteristic of education by the economic problems of many countries. Already in 1978 Ward & Templin mentioned a 'crisis for educational institutions facing declining enrollments, spiraling costs, and waning public support'. Costs of education 'are increasing at a faster rate overall than the economic resources to support them' (Mosher & Wagoner, Jr, 1978). It means a ' profound shock (..) from a growth psychology - a pattern of governance formulated during an era of steady increase in enrollment' (Kirst, 1978).
According to Coombs (1985) it means for many industrialized countries 'a mounting pressure to close surplus schools, to reduce staff, to curtail teacher trainer (...) to cut out what many critics consider frills in school programs'. But at the same time most if not all countries feel the increase of 'learning needs' for all ages and vocations and an increase of higher demands to the educational system, not only to prepare students for their first job but also for changing jobs - 'the whole world wakes up each day faced with a new and larger variety of learning needs'. In teacher training we see the additional problem of shortages of math and science teachers for many countries. That provides another reason for the statement that ' in the absence of sweeping readjustments and innovations in both educational and economic systems, the world of education and the world of work will become increasingly unbalanced and maladjusted (..) over the next 20 years' .

One can try to reduce this development to a problem of finance. In that case the allocation of resources for education is a result of choices which are only based on the analysis of the economic resources of a country. That introduces an economical dilemma in a specific way.
On the one hand economic laws prescribe to make investments based on

the optimal combination of the productive factors. It is the world of 'prices', 'costs', 'profit', 'and 'marginal efficiency of investment'.
(In the Netherlands it leads for the first time 'to study the market' - the government asking the National Economic Institute to prepare the admission policy for teacher training at the university by computing the numbers of students needed for the different school subject areas).
It may be clear that in that case no prediction for the future is made in terms of investments in human capital. But exactly this investment - terribly difficult as it is to compute 'human capital'- provides the quality of a society in the long run. The wealth of a nation should not be measured merely by the statistics of the nation's GNP but also by indicators of mental investments for the future.

I do not deny the necessity to control excess demand by means of admission policies for education in order to allocate resources as good as possible. But admission policies and financing mechanisms often do not seem well co-ordinated (OECD, 1983).
For instance in this country a new law regulates the number of students allowed to go to teacher training at the university and regulates the resources globally. But it leaves open to decision makers who are working at a non governmental level to provide facilities in terms of money for specific courses, staff-student ratio, etc. These decision makers often are not specialists in the field of teacher training. But their decisions, together with the pressure from economic laws working on a national scale, point into the same direction: try to get cheap teachers. Cheap training courses are a good start for that objective.
And cheap training courses can provide an argument for future low salaries: 'Each product has its price'.

4. Educational dilemmas

In this section I will mention some aspects of the transmission of knowledge as far as these provide a sometimes forgotten educational problem in teacher training.
Scientific ideas about what knowledge really is have changed fundamentally in recent years. The new ideas should be known to those who have to decide on the allocation of finance for teacher training. In my opinion the new ideas on the nature of knowledge implicate

educational arguments against cheap teacher education.

4.1. Objective and idiosyncratic knowledge

A teacher should have a well-formed opinion about 1. the structure and importance of knowledge; 2. the way people build their own cognitions when dealing with their experiences of an outside world including school and 3. the way a teacher in his role of educator can influence the communication between that outside world and inner worlds of cognition i.e. how he or she can stimulate learning processes (van der Dussen, 1987b).

A still strongly defended position holds that true knowledge is a collection of objective, proven facts, laws, concepts, etc. There is such a thing as 'knowledge without a knower' (Popper, 1979). The aim of education and teaching should be to transmit as much as possible of this kind of knowlege to learners, together with logic as the tool for logical-analytical thinking.

Knowledge also seems to be connected with language-as-mathematics. If it is true that we can express our understanding of the world in sentences that are at the same time isomorph with the states of our mind and with the informational content of a part of the outer world, we can defend the machine analogy of our minds with computers (Gardner, 1985). This is the Artificial Intelligence and cognition-as-computation discussion (Hofstadter, 1986; van der Dussen, 1987h). The premise of AI is that thoughts are computational entities upon which operations are performed in a specified order. In fact our knowledge store would be a sentence store.

For several reasons this position has been challenged strongly during the last years (Churchland, 1986; Dennet, 1984a; Charniak, 1983; Schank & Birnbaum, 1984; D'Andrade, 1981; Bruner, 1986; Kuhn, 1977). E.g. 'the supposition that the knowledge store is a sentence store comes to be regarded as untenable'(...)'language is a social art' (Churchland, 1986). We retrieve expectations and focus on meaning (Gardner, 1985). It means that '*many worlds are possible*' (...) '*meaning and reality are created and not discovered*' (Bruner, 1986).

This new type of thinking - partly based on experiments in cognitive science - throws again the question of the relation between idiosyncratic cognitions and 'objective knowledge' into the heart of instructional theories. Of course we can argue for the existence of linguistic scientific knowledge (van der Dussen, 1987b). This knowledge

is intersubjectively true. It is socialized (Harré, 1983) in the sense that it is shared by communities of scholars, who for the time being forget other constructs of reality, other orientations, other choices of interesting and meaningful knowledge - other possible worlds.
But specifying the knowledge store only in sentences is a losing strategy both for science as a dynamic activity of many different knowledge systems and for human beings. 'We have knowledge all right, but it does not consist in sets of sentences(...). If cognition is not in general the manipulation of sentences, then we don't know what is going on' (Churchland, 1986).

We have to deal with this rather uneasy situation in education. It seems that we no longer are allowed to think that our objectives - formulated in sentences - are of the same stuff as the cognitions in the heads of our students. When we are practising an evaluation system in which we demand the strict, verbatim, recapitalution of the right answers, the answers are only 'surface indicators' of deep layers of cognitive activity. As I said before 'when we make a choice for a selection system based on attaching much value to verbatim answers of students there is no problem at all. With standardized and formal languages we teach the school subject areas, as cleanly and objectively as we can, and wait and see what comes out as a result. Many students will fail and many will be succesful, but we have hardly any insight into the reasons why. That is the way it has been done and still is done in many cultures and educational systems'(van der Dussen , 1987h).

4.2. Knowledge and teacher education
The last section has important consequences for teacher education. My argument follows the next line of reasoning.
The 'magic of objective knowledge' gets more and more support from the implicit equalization of the 'wisdom' of a computer - reified symbols and sentences - with human knowledge. Facts are combined with the Newell-Simon (1972) kind of thinking by means of a logical-serial manipulator.
Also for teacher education there is temptation in the air. It seems there is from now on the possibility to formulate the knowledge teachers need for their profession as just building blocks of objective knowledge, definable modules of learning combined with tests, computer assisted minicourses, etc. This sounds already as an accusation. And it is. But I

do not intend to attack useful tools for help or efficient information bearers, but *the reduction of human information processing to the logical-analytical manipulation of sentences and the equalization of computerized knowledge with our cultural inheritance.* It is impossible to equalize 'computer wisdom' with the 'actual minds and possible worlds' by which we live our lives. It is 'far more important (...) to understand the ways human beings construct their worlds (..) than it is to establish the ontological status of the products of these processes' (Bruner, 1986).

In real life we make use of natural language and a rather unknown matrix of thought - cognition more or less connected with language. Only in the massive parallel processing of our human minds (Rumelhart & McClelland,1986; McClelland & Rumelhart, 1986) we make use of the full richness of our creative and sometimes very 'unruly' minds.

This argues against reduction of teacher education to courses based on computerized information as a commodity (Sayre, 1983) that can be bought, sold and transferred.

Teaching is the process of the continuous transformation of information *within human beings* who continuously transform their own person, and other people. We have known that from the time we educated teachers by learning students to follow their masters (or not!) or to work hard during their school practice period in order to be able to develop attitudes and feelings towards children and to be able to share the experience of their personal growth with others.

Future teachers are human beings. It takes a lot of time to develop them *by all means* to teachers who can play a constructive role in the creative development of a culture - either with a formal or nonformal educational system.

Putting another argument against 'objective knowledge' as the ultimate objective: the biggest part of the world population now and in the future will never be able to learn the structured knowledge that (Western) industrialized and rich countries try to teach in school. Many countries have to accept nonformal education for the majority of their people as almost the only possibility to shape better condidions for their inhabitants. They don't need to feel unhappy all the time because using a brain does not depend on a licensed textbook.

Education at all levels means the reframing and refocussing of information (Greenebaum, 1984) . In a special way this should be activated in teacher education. Only people who are aware of the

difference between objective knowledge and personal cognitions of education can play their cultural role in a flexible way in favor of the educational system of their own country.

These arguments are based on new theories about human information processing. We are asked to wake up to the fact that minds are processes. And they remain processes despite our wish to 'freeze' these processes in sentences to safeguard our educational objectives.
Support can be given by reformers who, in order to optimalize human potential, have defended open-mindedness, the importance of creative thinking for the development of a culture and the necessity 'to go beyond tomorrow without being naively idealistic' (Shor & Freire, 1987).
Is this the only line of defence for what will become an argument for time and money as permanent and essential prerequisites in teacher education? No, and therefore I will refer to section 2. and 3.

5. Imbalances and the role of teachers

The imbalances which destabilize the educational system continuously confront teachers and students with in former days unknown demands and changes. Teachers and teacher educators nowadays are working in open systems. Political decision makers may think to control the vectors of development of a particular society but the truth is different. A few years ago we did not have personal computers. Now we are almost disappointed that teachers did need some time to get acquainted with this new device. '*Did need some time*' formulates exactly one of the strength and weaknesses of the human condition. We can learn. Allright. When we are motivated we also want to learn. Allright. But we need some time because the flexibility of our cognitive apparatus is bought with an evolutionary weakness: thinking and imagining may be a rapid activity but acting *in a different way* as before involves the development of a whole person. In that case we experience barriers in a human being. The cognitive apparatus, always connected with affections and values, needs some time to integrate the thoughts, actions and emotions, needed for a new situation.
Teachers are confronted continuously with differences in age, level of performance, school subject areas, etc. Nowadays this main characteristic of the teacher's profession has been greatly enlarged by the described challenges of cultural systems with almost permanent

imbalances. Only human beings can cope with open systems in a creative way. This natural tendency to adaptivity - when not spoiled by the educational system itself - is a strength. But the weakness is that we need some time to develop and integrate new behavior.

The conclusion must be that in teacher education we have to prepare students *to a certain extent* for this type of professional life. The arguments cannot be found only in granted survival strategies, how important these may be, but also in the economic adage itself: the desire to combine the productive factors as good as possible. Education is a major investment and teacher education is part of it. For the political decision makers the interest might be to understand that in this case real costs have to be analyzed in terms of investments in human capital. Mirabile dictu - this argues for time and money in teacher training.

In my analysis human potential seen as another kind of capital can play an important social role within a social system which destabilizes itself permanently. The plea for a preparation for a society in permanent change may sound revolutionary. Open systems and open minds and rapid changing educational objectives may seem to be words with a revolutionary flavor. But there is no alternative. Because it is the answer to the imbalances we accept in a wider sense.
It argues for consciousness-raising for those decision makers who want to have it both: flexible *and* docile teachers and a controlled *and* creative schoolsystem. But the crisis of confidence in education itself (Coombs, 1985) should not be supported by governments but facilities should be created to find out what could be the recognized role for those who ' shape the minds and alter the hearts of our most valued and valuable resource' (Smith, 1982). And 'improper (professional) decisions send the learner towards incremental death in (...) inablitiy to learn and contribute to society(...). From this perspective, doctors and lawyers have neither more or less to do with life and death than do teachers(...). Teaching (...)must be entrusted only to the most thoroughly prepared professionals(..). To ignore or neglect the role of teacher education is to ignore the intellectual future of a country itself' (Corrigan, 1982).

Seen as an investment program on a national scale the dilemma is clear enough: reduction in teacher training facilities - making training courses cheaper - may in the short run seem to be a good investment. It

could be the start of a new generation of cheap teachers, whose profession is supposed to be a simple one and who therefore can be paid lower as other comparable professionals. But in the long run such a choice may turn out to be a bad one and the result only a high price for bad investments.

6. The preparation of teachers for an innovating and flexible role

Till now I defended that political decision makers should recognize the social importance of teachers who are well prepared for an innovating and flexible role in a society which creates the described imbalances. A society moreover which is expecting the rapid solution for many frictions from educators. Already in 1974 Unesco formulated the educational objective to 'develop aptitudes and skills such as a desire and ability to make educational innovations (...) experience in teamwork and in interdisiciplinary studies', etc. I suggested that it always will take time and money to prepare teachers for this task. It takes time because of the properties of the cognitive system of human beings. And time - either for guided discovery or tutored learning - is money.
This leads to the question how students can be brought to an attitude and knowledge base by which they consciously can play their innovating and flexible role. Which knowledge base is necessary? And what type of experiences are needed? For the answer I also make use of my own experiences (e.g. van der Dussen, 1981a) as a teacher educator at the university of Leyden during the last ten years. I was lucky to teach students with a new and an older approach within the same period.
In the new courses - of course including the traditional elements of the curriculum - students were deliberately prepared for uncertainty. This is not an entirely new objective because 'If all knowledge, or 'thruth' is provisional, then as educators we are by definition concerned with initiation into uncertainty' (Mably, 1985).
It means that within the same course students have to build up self-confidence towards the existing schoolsystem and school subject areas as if these have only stable characteristics *and* get the feeling for the temporary construction of curricula. Students should not only get that feeling but must try to experience change on a small scale. After having build up self-confidence with the traditional approaches the idea of growing responsibility can be developed with small projects that can be introduced and examined on their usefulness in school. This innovation

gives a dimension of action both in the university course and the traditional school (van der Dussen, 1983c). These projects are inspired by new instructional methods, the desire for new grouping of pupils, new subject matter, problems in school, etc. Supplied with extended information on the historic development of the particular school system students in this way get the feeling of school existing at a 'time axis'. Within the same teacher training course they learn to see change as the permanent characteristic of a school system and themselves as working as 'stabilizers' *and* innovators.
The delicate equilibrium between trust and fear, being a standard and feeling lost by rapid developments, influenced by an outside world, should be guided by teacher educators in close cooperation with school practice teachers. The exchange of experiences between students and their teachers is imperative to this type of teacher training.
The results in our courses are most promising. Many students have succeeded in getting investigated both characteristics of the school system. The written reports of students about this approach are in sharp contrast with the reports of students who only learn to know schools as stable institutions. In the new courses students build up self-confidence in relation to the dynamics of education. They are displaying 'environmental competence' (Osborne, 1984).

With so many different teacher training models and different school systems in many countries I do not argue for a specified model. But is clear enough that the type of teacher training I indicated costs more than other types of preparation. The development and *integration of all types of learning experiences* takes time.
As I indicated before for the real costs should be looked at the future. On the one hand we all know the almost hereditary capacity of a school system to impose rigidity in thinking and acting on newcomers in school. On the other hand many future teachers seem to be able to make use of the full potential of their creative minds to handle the problems of gender, race, religion, socials class, etc. at least when in teacher training they had the experience to deal competently and humanly with the educational problems of the society they belong to. Then they want to transfer their own experience: that there are no limits to learning (Botkin et al., 1979).

7. Conclusion

The imbalances of the social system of a country confronts political decision makers with the economical choice either to improve the training of teachers at the risk of higher costs or to reduce facilities. It is tempting to defend the cut down of finance with the argument that knowledge needed for a teacher's profession can be disseminated as 'objective knowledge' - and therefore can be sold and bought at the lowest price as every other commodity.
It can be argued that this view cannot be supported. New ideas about knowledge and the working of the 'mind' are stressing the idiosyncratic status of cognition. Because in teaching the whole person is involved - thinking, acting, feeling in a challenging interaction with other people - it takes time to change cognitions useful for new situations. This experience should be included in teacher education together with the experience that answers to new imbalances can be found by teachers.
Otherwise teachers themselves will create another really serious imbalance: an educational system, not able to cope with the problems of the society by which it was created. Therefore the second choice should be rejected. *Cheap teachers prepared for their task by cheap teacher training courses will turn out to be a high price for bad investments.*

The profit from the high costs can be found in teachers who are prepared for a respected role in which they make their own contribution to the solution of the problems of that remarkable phenomenon named modern society. Nations seem to be at risk (1983) continuously. All of mankind gives way to the flow of information and to 'the flux of change' (Mandler, 1985) that expresses itself in human beings with their thoughts, actions and emotions. By expressing themselves to others, for instance by 'teaching', people are reshaping the future of other people.
What kind of expertise do we want for that activity?
As a society what price do we want to pay for our own future?

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